

***Cassia auriculata* and *Cyperus rotundus* as green corrosion inhibitors in hydrochloric acid**

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Methanol extracts of *C. auriculata* and *C. rotundus* rich in antioxidants were chosen as corrosion inhibitors and their inhibition efficiencies were studied using weight loss measurements, linear sweep voltammetry and Tafel extrapolation method. The optimum concentrations of *C. rotundus* and *C. auriculata* which caused the highest inhibition efficiencies were 1100 and 600 ppm respectively. Both the inhibitors followed Langmuir, Temkin and Freundlich adsorption isotherms and the calculated adsorption Gibbs free energies ($\sim -20 \text{ kJ mol}^{-1}$) suggest physisorption of both inhibitor molecules on the steel substrate. Corrosion potential of the steel substrate in HCl is -0.709 V . In the presence of *C. rotundus* (1100 ppm) and *C. auriculata* (600 ppm) the corrosion potential shifted to more negative values, -0.746 and -0.765 V . Calculated corrosion current densities from Tafel extrapolation method are 1.45×10^{-4} (HCl), 0.79×10^{-4} (*C. auriculata*) and $0.60 \times 10^{-4} \text{ A/cm}^2$ (*C. rotundus*). These values indicate mixed type inhibition. The negative shift of corrosion potential in the presence of inhibitors suggests their predominant control over cathodic reaction. The results of this work indicate that methanolic extracts of both *C. auriculata* leaves and *C. rotundus* rhizomes can be used as green corrosion inhibitors in acidic medium.

Keywords: *Cassia auriculata*, *Cyperus rotundus*, green corrosion inhibitors

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